REMARKS

I. Introduction

The undersigned thanks Examiner Sullivan for his review and consideration of the present Application. In response to the non-final Office Action mailed July 19, 2010, the undersigned submits the foregoing amendment and the following remarks ("Response"). Claims 1-7 are pending in the application. The foregoing amendment amends claim 1. Support for the amendment is found in the specification. *See e.g.* page 4, 6th paragraph. No new matter has been added.

II. REJECTION OF CLAIMS 1-7 UNDER 35 U.S.C. 103(a)

The Office Action rejected claims 1-7 under 35 U.S.C. § 103(a) alleging that the claims are unpatentable over U.S. Patent 1,207,270 to Braithwaite (Braithwaite) in view of U.S. Patent No. 5,412,842 Riblett (Riblett).

In rejecting claim 1 the examiner alleged that Braithwaite describes a check mechanism operably connected to a hinge pin and a check body rotatably located against an annular cam track. Office Action, p. 2. However, Braithwaite does not describe these elements.

Braithwaite describes a ball 17 which is secured within a hub 9 of a first hinge leaf 7 by a first plate 18. The ball 17 cooperates with a second plate 21 that is secured to a boss 11 of a second hinge leaf 8 by a plurality of rivets 22. Each of the ball 17/first plate 18 and the second plate 21 is unconnected with the hinge pin 13. Indeed the hinge pin 13 is free to rotate within both of the hinge leaves 7, 8. As a result the hinge pin 13 in the Braithwaite arrangement cannot transmit any torque from either hinge leaf 7, 8. Thus, Braithwaite does not describe a check mechanism operably connected to a hinge pin, as required by claim 1.

The ball 17 described by Braithwaite cooperates with a second plate 21, which is a circular disk. The circular disk is not an annular track and thus, the ball 17 is not rotatably located within an annular track. Braithwaite does not describe a check body rotatably located against an annular cam track, as required by claim 1.

Rotatably locating the check mechanism within an annular cam track that is formed on a reaction member which is in the form of an annulus and equally spacing the check members circumferentially about the hinge axis, results in the balance of the forces within the check mechanism and prevents the generation of undue friction between each check member and the cam track. Thus, in one implementation, the claimed invention allows a user to move a heavy vehicle door from a checked position to a closed position.

Braithwaite does not describe a hinge that can be used to move a heavy door and does not address the large check forces and torques that are needed in such an implementation. Braithwaite describes a hinge for use on casement doors and windows and other similar places. Braithwaite, page 1, lines 9 – 11. Braithwaite teaches a hinge construction which imposes all the forces generated by check springs 16 onto a cap 14 that holds the hinge pin 13 between the two hinge leaves 7, 8 and in turn holds the hinge leaves 7, 8 together. Such an arrangement creates a high degree of friction between the cap 14 and the adjacent boss 11 of the second hinge leaf 8. While a user may be able to overcome such friction when attempting to move a lightweight casement door or window, as described in Braithwaite, the user would have much more difficulty overcoming the resulting increased friction generated with one hinge leaf supporting a heavy vehicle door. The inclusion of check springs able to exert sufficient compressive force to check, *i.e.,* hold, a vehicle door on an incline would further exacerbate a user's likely inability to overcome the resulting friction. As a result the hinge described by Braithwaite cannot provide easy moving of heavy doors from a checked position to a closed position.

The examiner admitted that Braithwaite does not describe that the hinge pin is rotatably mounted in one hinge leaf and non-rotatably mounted in the other hinge leaf. However, the examiner alleged that Riblett describes a detent hinge with a hinge pin 58 rotatably mounted in one hinge leaf and non-rotatably mounted in the other hinge leaf and alleged that it would be obvious to combine this aspect of Riblett with the hinge described by Braithwaite. Office Action, p. 3.

Claim 1 requires that the hinge pin is rotatably mounted in one hinge leaf and non-rotatably mounted in the other hinge leaf and that the check mechanism is operably connected to the hinge pin. By non-rotatably mounting the hinge pin in the other hinge leaf and operably connecting the hinge pin to the check mechanism, the hinge pin is able to transmit torque from the other hinge leaf to the check mechanism. This allows selective removal of the other hinge from the hinge assembly, *e.g.* by separating the other hinge from the hinge pin, without having any detrimental effect on the check mechanism. Such "lift-off" functionality is highly desirable during many operations, such as vehicle assembly operations where it allows door removal and replacement to facilitate the installation of other vehicle components.

The hinge pin 13 described by Braithwaite cannot transmit torque from either hinge leaf 7, 8 because the hinge pin 13 is free to rotate within each hinge leaf 7, 8. Thus, the hinge pin 13 cannot transmit torque from either hinge leaf to the check mechanism. As a result it is necessary for the first hinge leaf 7 to directly engage with the check mechanism by way of the first plate 18, and for the second hinge leaf 8 to directly engage with the check mechanism via the second plate 21. This direct engagement of each hinge leaf 7, 8 with the check mechanism means that removing one hinge leaf 7, 8 from the hinge assembly has a negative effect on the check mechanism. In particular, separating the hinge leaves 7, 8 from one another in the Braithwaite arrangement exposes each of the first and second plates 18, 21. These two parts of the check mechanism therefore become liable to potential contamination or damage. Accordingly, while the hinge leaves 7, 8 in Braithwaite are separable from one another so as to provide a degree of lift-off functionality, the resulting risk of contamination or damage to the check mechanism thereof is completely unacceptable in many operations, such as vehicle assembly operations.

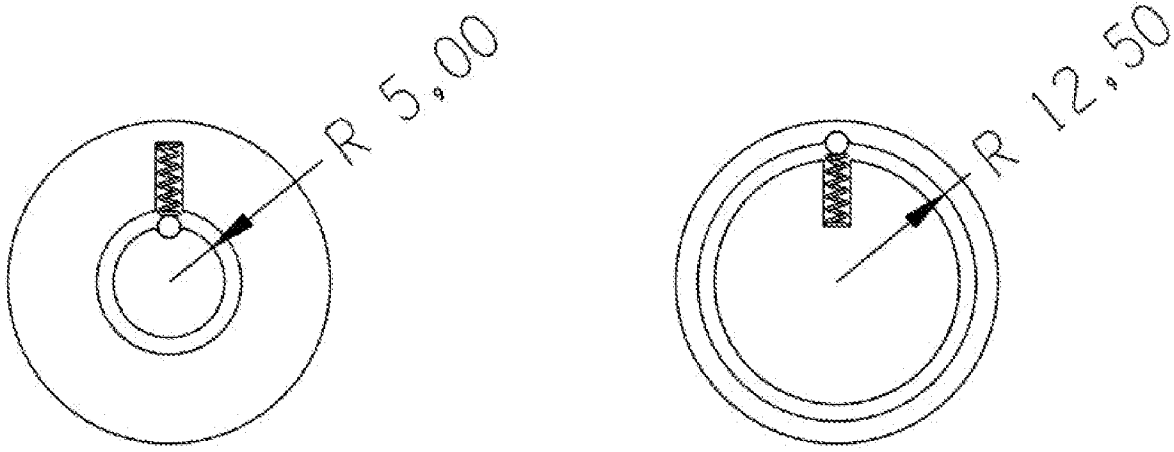
Riblett discloses a hinge arrangement in which a hinge pin 58 is non-rotatably mounted in a first hinge leaf 14. The hinge pin 58 forms an integral part of a check mechanism by including apertures 82, 86 to receive check members, *i.e.* balls 73, 74, 75. Riblett does not teach operably coupling the hinge pin to the check mechanism

since the hinge pin forms a part of the check mechanism. As a result Riblett does not allow separation of the first hinge leaf 14 from a second hinge leaf 16 without exposing the check mechanism to contamination and/or damage.

The Office Action does not provide a reason for one of skill in the art to combine Braithwaite and Riblett in the manner suggested by the examiner. Thus, the rejection is improper. Even if the combination were made, despite the lack of a reason to do so, the combination does not describe that the hinge pin is rotatably mounted in one hinge leaf and non-rotatably mounted in the other hinge leaf and that the check mechanism is operably connected to the hinge pin. As described above the combination of the references would lead to an undesirable result, the exposure of the check mechanism to contamination and/or damage.

The examiner also admitted that Braithwaite does not describe that the check members are biased in a radial outward direction relative to the hinge axis. However, the examiner alleged that Riblett teaches check members biased in a radial inward direction and that this aspect of Riblett could be combined with the hinge of Braithwaite and that the combination could be further modified to change the bias direction.

Biasing the check members in a radially outward direction maximizes the check force they are able to generate within the limited packing space of a hinge assembly, as illustrated in connection with the diagrams below:



Each of the arrangements shown above has the same outside diameter and the maximum check force, *i.e.* maximum check torque *T*, which each arrangement can generate is given by:

$T = kR$

where *k* is a constant determined by the spring force and *R* is the cam radius.

The radially outward biased check member is able to generate a maximum check torque of 12.5k while the radially inward biased check member is able only to generate a maximum check torque of 5k. Accordingly, when utilizing an identical spring, *i.e.* when *k* is constant, the radially outward biased check member is able to generate more than twice the check torque within the same packaging space.

The examiner alleged that the balls 17 of Braithwaite describe the claimed check members. As shown in Fig. 3 of Braithwaite, the balls 17 are biased in a direction that is parallel to the hinge pin 13. Not only does Braithwaite fail to describe check members that are biased in a radial outward direction relative to the hinge axis, Braithwaite teaches away from the claimed check members since the balls of Braithwaite are biased in a direction parallel to the hinge pin.

Braithwaite is unconcerned with accommodating large check forces and torques since it is intended to be "sufficient to hold a window under ordinary conditions." Braithwaite, page 2, lines 30-35. Braithwaite describes that if additional resistance is needed, that the cap 14 can be tightened. Braithwaite, page 2, lines 35-37. Moreover the hinge construction of Braithwaite teaches away from maximizing the check torque since to do so would increase the loading on the cap 14 and in turn increase the resulting friction to a level at which it would become increasingly difficult for a user to move a door or window attached to the hinge.

Riblett is also unconcerned with maximizing the check torque that can be generated within a given packaging space. This is not least because increasing the check torque would result in increased friction that would impact on a user's ability to easily move a heavy door. Riblett describes that if additional torque is needed then the number of biased members will be increased. Riblett, col. 1, lines 68 – col. 2, line

3. Accordingly Riblett makes no suggestion of biasing the check members 73, 74, 75 in a radially outward direction. Furthermore, Riblett does not describe springs that would fit within the interior space provided within the hinge pin 58.

Biasing the check members in a radially outward direction produces a different check torque than biasing the check members in a radially inward direction. A radial outward bias has the advantage of maximising the check torque that can be generated in a given packaging space. Neither Braithwaite nor Riblett identifies the need to maximize the check torque in a given packaging space. In addition, both of the references identify ways of increasing the check torque that do not involve biasing in a radially outward direction. Reversing the direction in which the check members are radially biased is not a simple reversal of parts because such a change has an unexpected benefit which was unrecognized in the prior art.

The examiner alleged that it would have been obvious to combine the mounting of the hinge pin in the hinge leaves and the biasing of the check members described by Riblett with the hinge described by Braithwaite and to modify the resulting biasing "because a rearrangement of parts and a reversal of parts is generally considered within the ordinary skill of one in the [art] barring any unforeseen result." Office Action, p. 3. However, the examiner has not provided the required reasoning to support an obviousness rejection. The rejection fails to provide a reason why one skilled in the art would modify Braithwaite with any of the elements of Riblett, especially since the combination fundamentally changes the hinge described by Braithwaite. For example, changing the mounting relationship between the hinge pin and the leaves of Braithwaite to that described in Riblett would destroy the ability of the hinge pin to rotate within both leaves, as described in Braithwaite. Changing the biasing mechanism described by Braithwaite to that described in Riblett would also require changes to the hinge pin and to at least one of the leaves and would complicate the construction of the hinge contrary to an objective of Braithwaite to provide a hinge which is "simple in construction." Braithwaite, page 1, lines 32-34.

As described above, there is no reason to combine Braithwaite and Riblett in the manner suggested by the examiner and even if combined, the combination does not describe the claimed invention. Thus, claim 1 is patentable over Braithwaite and Riblett.

Claims 2-7 depend from claim 1 and are patentable for at least the same reasons given for claim 1 and may be patentable for other reasons as well.

CONCLUSION

The Response is believed to be completely responsive to the Office Action. It is submitted that the application is in condition for allowance and a notice of allowance is respectfully requested.

EXCEPT for the issue fees payable under 37 C.F.R. § 1.18, the Director is authorized by this paper to charge any additional fees during the entire pendency of this application, including fees due under 37 C.F.R. §§ 1.16 and 1.17 that may be required, including any required extension of time fees, or credit any overpayment to Deposit Account Number 11-0855. This paragraph is intended to be a **CONSTRUCTIVE PETITION FOR EXTENSION OF TIME** in accordance with 37 C.F.R. § 1.136(a)(3).

If there are any matters that can be addressed by telephone, the Examiner is respectfully urged to contact the undersigned attorney at 404 685 6799.

Respectfully submitted,

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